

# PATENT SPECIFICATION

671,188



Date of Application and filing Complete Specification : July 5, 1950.

No. 16765/50.

Application made in Australia on July 13, 1949.

Complete Specification Published : April 30, 1952.

Index at acceptance:—Class 40(v), L(3c:11i).

## COMPLETE SPECIFICATION.

### Improvements in and relating to systems of underground communication

I, ARTHUR VICTOR PICKERING, of 164, Blair Street, Bondi, in the State of New South Wales, Commonwealth of Australia, an Australian citizen, do hereby declare the 5 invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention comprises improvements in 10 and relating to systems of communication for use underground and especially in mines.

The main object of the invention is to make it possible to establish radio communication between a stationary point and a 15 locomotive, truck or other vehicle moving along or stationary in an underground tunnel, or between one such vehicle and another.

Although the distances between the stationary point (say the foot of a mine shaft) 20 and the vehicle in the mine gallery or other tunnel may be very short in comparison with those over which radio communication may be satisfactorily established above the surface of the earth, nevertheless it is found 25 in practice that radio communication is impracticable underground over distances greater than a few hundred yards, and unsatisfactory over even shorter distances, because the radio waves are quickly absorbed by the 30 rock or other materials through which the tunnels pass; any deviation of the tunnel from a straight line and the presence of any metalliferous ores in the rock around the tunnel still further diminish the effective 35 range of radio contact.

According to the present invention a system of communication for use underground comprises essentially a radio transmitter for the transmission of a high 40 frequency modulated carrier wave, a radio receiver and an untuned and unterminated carrier wire insulated from electrical contact with the earth or with any source of power and extending from a point adjacent the 45 transmitter to a point adjacent the receiver, the receiver and the transmitter being provided with aerials or the functional equiva-

[Price 2/8d.]

lent thereof arranged to form a loose coupling with the said carrier wire.

The system may be operated with low 50 power, the radio waves being conducted along the carrier wire instead of being dissipated into and absorbed in the earth, and travelling along a mine gallery or other tunnel notwithstanding the ordinary deviations from a straight line of the latter. At any point along the length of the carrier wire the radio waves radiated therefrom may be picked up by a simple receiving set.

By making the coupling between the transmitter and receiver and the carrier wire a loose one, the wire may be extended throughout the mine as new galleries are opened up and the mine extended without substantially effecting the tuning of the sets. This is an 60 important point in the successful working of a practical installation. The absence of any tuning or terminating devices in the wire makes its construction and installation relatively simple and inexpensive. 70

In a practical embodiment of the system for use in a mine the radio transmitter would be preferably installed at a convenient point underground in the mine and the carrier wire would extend along the sides of the galleries 75 to the furthest points with which it was desired to establish communication.

Normally the receiving set would be mounted upon a mine haulage locomotive, truck or other vehicle running parallel to 80 the carrier wire and having an aerial extending parallel thereto and spaced about a foot therefrom. A flat coil or other form of aerial may alternatively be provided.

Instead of the receiver being mounted 85 upon a vehicle it may be carried by a pedestrian, who is then in constant communication with the stationary station, without having to connect any instrument to a telephone wire, as in ordinary systems of mine 90 communication.

The term "wire" includes rods and other lengthy metal conductors.

The transmitting station may be furnished

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